

## APPENDIX 1

### Preface

This document details a complete network topology necessary to support all business operations on an in-house basis. Its purpose is to present an ideal solution which takes into account our expected short-term and long-term growth while leveraging only proven technologies based on solid standards and industry support. The products composing the topology were selected based on price-performance considerations and in most cases reflect the lowest "price-per-port". However, in some cases performance and industry backing outweighed price. The topology has been designed to provide an easy cheap expansion to service the explosive growth potential of this effort and as a direct result the topology exceeds our startup needs. The cost differential will be more than covered during service expansion phases by allowing us to leverage our then existing infrastructure instead of forcing us to "throw-away and rebuild".

The business operations of this effort can be broken down into three main technologically focused areas. First, is the "Data Center" which provides all data support services to the company and to the customers. Those services encompass everything from the website to email to vendor relationships. Second, is the "Operations Center" which is where company administration takes place including marketing, accounting and general operations activities. Finally, the "Service Center" area is where our customers interface with the company. Whether those customers are investors or retailers, this is the area that arguably represents the greatest growth potential. No matter how effective our website is in answering customer needs, a customer base of potentially millions will make one-on-one customer interaction our biggest problem and potentially our biggest competitive advantage. The topology detailed in this document has been specifically designed to accommodate growth in this area.

### Discourse

This network topology is based on an emerging yet reliable technology called converged networking. Voice, video and data traffic is integrated on a single network. The driving forces behind this technology are cost reduction, support for sophisticated highly integrated applications and the provision of greater network flexibility, control and functionality. Rather than creating multiple smaller disparate networks to service our different business activities, a single integrated network is created with a high-speed core and medium-speed edge services. The core or backbone is based on Asynchronous Transfer Mode (ATM) connection-oriented technologies that can deliver the true "Quality of Service" (QoS) and "Class of Service" (CoS) on a per-connection basis required to support the desired convergence of voice, video and data traffic. While the edge is based primarily on Fast Ethernet technologies to provide fast, simple and cost-effective workgroup connectivity. Where necessary to support Service Center operations, edge services are supplemented by ATM. Certain services have been deemed mission-critical and thus network redundancy has been built in where appropriate. It is important to note that not all services have been deemed mission-critical and thus this design has NOT been made fully redundant in an effort to reduce costs. The resulting design, detailed in the following sections and figures, is capable of supporting the following services and benefits:

- Extraordinary scalability of both bandwidth and the distances over which the physical network can extend. The network backbone is capable of supporting multi-floor and multi-building company configurations as well as a vast number of client machines.
- High data availability, scaleable bandwidth and capacity, cross-platform data sharing, reduced network congestion. Not only must the backbone be able to scale to meet demand, so must the data storage facilities. This network topology includes a secondary ultra-high speed network dedicated to the delivery and storage of data.
- In-house scalable web hosting. As visitor traffic grows and as capabilities grow (i.e., new or enhanced services are added) so will our need to more closely control our website. The current operating model already requires constant interaction with website customer related databases to provide access to customer information for the Service Center and for vendor interaction. Additionally, to achieve the best price-performance tradeoff in servicing potentially millions of website visitors will require the

## **Data Center** (Reference figure 1)

From a technology standpoint, this is core of our business activities. To be responsive to changing markets, to deliver better service at lower costs and to support emerging applications, traditional shared network infrastructures must be discarded. Instead, the infrastructure must be based on high-performance switched topologies. Savvy customers and resource intensive emerging applications are the driving forces behind the need for increased network capacity and the convergence of voice, video and data infrastructures.

### **Backbone**

The network is based on 3Com's Transcend® Networking framework, providing the ability to scale, extend and manage network growth to support company expansion. The core of the network consists of one CoreBuilder 7000HD high-density switch with multiple eight-port OC-3 multi-mode modules. The system has a redundant high-density switching engine and power supply to provide high-availability service to the mission-critical operations of the website and vendor interaction. The CoreBuilder 7000HD system delivers 155 megabits-per-second (Mbps) ATM links to Fast Ethernet edge switches supporting end-user desktops and servers. SuperStack II switches are deployed at the edges due to their ability to allow the ATM backbone to extend into the switch itself, thus exploiting ATM's load-sharing capabilities for maximum performance, scalability, and resiliency.

To provide Internet access to the network, the PathBuilder S600 with multiple T1/E1 UNI interface modules is used to deliver high aggregate throughput rates without the costs of T3/E3 access charges. The T1/E1 UNI module uses several low-cost T1/E1 links that are bonded together to form a single logical link, providing the highest-capacity and lowest-cost ATM access.

### **Storage Area Network (SAN)**

A number of factors can contribute to the explosion of data that would overwhelm traditional storage architectures. Certainly the accumulation of data on potentially millions of customers and the archiving of vendor transaction data will contribute to the load. Add to that, the introduction of data-intensive collaborative applications such as enterprise resource planning, decision support and on-line transaction processing (OLTP), we could see 50-100% annual growth in data storage requirements.

Additionally, near-continuous access to that ever-increasing pool of data is mandatory under our current model. As a result, performing the necessary backup and recovery procedures across the network, with minimal disruptions to website visitors and end-users, will become very difficult with traditional storage architectures.

As a result, servers and storage will be centralized and consolidated to better manage this potential explosion of data and the overall cost of ownership. The SAN will allow data-intensive storage processes to take place without congesting the network. Furthermore, as a separate network a different network protocol will be used - Fibre Channel - that is better suited to handling storage I/O (SCSI commands and data) than standard networking protocols. The SAN connects to all relevant servers and is based on Compaq's Fibre Channel Arbitrated Loop (FCAL) and is capable of transferring data at a 100 megabytes-per-second. Initially, the FCAL will be used to connect the servers to a high-speed tape library - the DLT 15 Cartridge 35/70 - via a Fibre Channel Hub and a Fibre Channel Tape Controller. In the future this configuration will allow an easy migration to disk arrays with Terabyte capacities.

### **Server Pool**

To provide high-availability centralized platforms to service company-wide needs like email maintenance, customer relationship maintenance, vendor relationship maintenance and alike, a server

ability to continually fine-tune the website-hosting environment. Although, this ability is afforded in a co-location schema, the premium prices necessary to achieve that flexibility coupled with the need to have constant interaction with the customer databases creates a situation where in-house hosting is more desirable and cost-effective.

- Enhanced customer service. Customers can access agents via website-initiated calls or callbacks, email, fax, or standard telephone service. This coupled with an agents ability to access all company services, due to an integrated network, provides an infrastructure that allows our customer service center to handle any customer related issue, thereby reducing the number of personnel traditionally required to service these disparate means of customer interaction.
- Optimized connections to ISP and LEC. The ability to provision only necessary bandwidth is essential to reducing recurring costs. The Wide Area Network (WAN) hardware deployed in this network topology provide the ability to quickly increase the bandwidth of our connections to the ISP and the LEC while provisioning only what is required.
- Corporate communications. Intranet services and other educational services can be delivered to employee desktops. Voice and video can enhance human resource and internal training activities as well as company policy information dissemination.
- Telephony toll reduction through economies of scale that are driving down the cost of packet switching equipment in relation to the cost of circuit switched devices.

Although there are any more benefits and services provided by this network topology, the overriding benefit is the potential for cost reduction. In this converged network the most cost reduction is realized from the elimination of unnecessary infrastructure duplication. It must be noted that some duplication is desirable in order to meet reliability objectives. However, there are unjustifiable costs associated with duplicate equipment acquisition and maintenance for separate data, voice, and video networks. Costs which take the form of duplicate management infrastructures for these networks, duplicate personnel to service these networks, and duplicate facilities costs (for example, for wire closet floor space, cooling, power) to bring the services of these networks to users.

pool is setup in the Data Center on its own switched segment. The pool consists of Compaq ProLiant 3000R servers; all are members of the SAN for backup and recovery operations. Additionally, the pool will be serviced by its own printer – a HP LaserJet 4500 DN - for any automatic reporting that becomes necessary.

A full 100 Mbps is available to each server via a SuperStack II 3300TX switch. The prescribed segmentation also provides an easy migration path to higher bandwidths if necessary to support future requirements. ProLiant 3000R machines were chosen for their speed, reliability and ability to upgrade. As installed, they will initially be configured as single Pentium II 450 MHz – 512K cache – processors with 256 MB of 100MHz SDRAM and two 18.2 GB disks. They can be upgraded to dual processing units with 4 GB of memory and 145.6 GB of disk and for the future they have an upgrade path to 4P Xeon chips, making them ideal departmental sized servers.

The Server Pool is where the bulk of the back-office processing will occur. Interface with retail vendors and support vendors, like DST, will reside on these machines. Currently, four servers make up the pool and service the following needs:

- Email – Inbound/outbound company-wide email is managed here. Additionally, this machine services inbound email from the website as well as manages outbound email campaigns to the customer base. Email auto-responders reside here.
- Customer Service – Although a separate Service Center exists to manage one-on-one customer interactions, maintenance of customer profiles and interaction histories are managed here. Company-wide access to all customer service information is afforded via this server. Note that customer transaction records with the website are maintained separately.
- Retail Vendor Interaction – Relationships with retail vendors that require special support are handled on this server; some retailers may not be able to adhere to our normal transaction interface.
- Support Vendor Interaction – Transactions with financial product vendors or agents are managed on this server. This pool has complete access to the website customer databases via the ATM backbone and thus applications running periodic tasks, which interact with the support vendor APIs, are supported.

Although, it is possible to aggregate these services on fewer servers, planning for future growth dictates a physical separation of service support mechanisms.

## Website

The site's potential for exponential growth, highly variable traffic patterns and the desire to create a satisfying user experience necessitate us to focus on three areas – reliability, scalability and performance. To address these areas, the website-hosting architecture is based on a distributed server array architecture and can be broken down into two layers. First is the Application Service Layer (APS) which services incoming HTTP requests. The second is the Data Resource Layer (DRL) which services all data requests from the APS to include website content and database interaction.

The APS is composed of an array of 10 Compaq ProLiant 1850R, all dual processor capable with 128 MB SDRAM and one 450 MHz chip. The array is load-balanced by one BigIP system from F5 Labs which is composed of two BigIP servers where one acts as the primary and one acts as the secondary to provide fail-over recovery services. The BigIP servers securely distribute Internet/Intranet user requests to the machines in the array that are most capable of handling them and provide a single IP address (or domain name) to all the machines in the array. Additionally, the BigIP servers are capable of maintaining secure sessions with specific machines within the array to provide SSL services. Studies show and experience dictates that more modestly equipped servers are more efficient in terms of performance, scalability and price than fewer high-end servers are. In addition a dynamically created website, such as this one, does not necessarily benefit from increased RAM – 128 MB is usually the optimum amount. Although these same studies indicate that the addition of secondary

processors within dual processor capable machines does not always translate to increased performance, the architecture utilizes dual processor capable machines for flexibility. Bandwidth to the APS is provided by the aggregation of 4 T1 lines from the primary ISP. 2 aggregated T1 lines provide backup bandwidth from the secondary ISP.

The DRL is a cluster composed of two Compaq ProLiant 6500 Xeon based machines and a shared Fibre Channel Disk Array configured as 2 RAID 5 arrays with no-single point of failure. The primary server has two 450 MHz 2 MB cache Xeon chips and 512 MB SDRAM, while the secondary server has one 450 MHz 512 KB cache Xeon chip and 256 MB SDRAM. This cluster hosts all website files and the database server. The DRL and the APS shared the same network segment created by a SuperStack II 3300 TX 100 Mbps Fast Ethernet switch.

This web hosting architecture segregates the workload in the most efficient means possible and eliminates most single points of failure. Although two switches are left in the architecture as single points of failure, due to large mean time between failure ratings and the low cost and high availability of the switches, it was deemed impractical to provide redundancy to cover their potential failure. Unattended estimated average time for fail-over recovery to occur is approximately 1 minute. Manual recovery of non-redundant switch failure is estimated to be at 30 minutes. Thus this architecture can be considered very reliable.

This architecture's scalability will enable it to meet new user demands. Adding web application servers as demand increases is a simple process due to the load balancing technologies employed and the centralization of the website files and database servers. Unlike traditional web hosting architectures, the time consuming process of replicating and synchronizing server content has been eliminated.

Peak performance of this architecture is estimated at 150 pages-per-second. Where the average page is 56K in size and requires 25 I/O transactions. Since performance estimates can not be calculated without accounting for the deployed software architecture, please see the corresponding discussion in the "Software Architecture" document. Based on rough estimates<sup>1</sup> of anticipated traffic, the average pages served per second will be at 10 – 15. This results in a 10% utilization of peak performance. Due to the potentially highly variable nature of the traffic patterns at this site, provisioning 10 times the expected average is highly recommended. It is important to be able to handle bursts of traffic as well as sustained levels.

*1. A rough estimate of traffic was calculated as follows. Assume one million registered users will access the site four times a week. Although it is highly unlikely registered users will access the site four times weekly, this number was chosen to account for their actual traffic, related vendor traffic and new user traffic. Based on these numbers one can assume ~570K pages per day will be served. Assuming that most of that traffic will be concentrated in 12 of the 24 hours in a day results in ~13 pages-per-second or 10 – 15 pages-per-second.*

## **Operations Center**

(Reference figure 2)

This is where the bulk of the day-to-day operations take place. Administrative, finance and engineering personnel are serviced here. Three segments off the ATM backbone have been created and correspond to these personnel segmentations. Each consists of end-user workstations and a server. Each server is currently configured with its own disk storage of two 18.2 GB disks and is connected to the SAN for backup and recovery operations.

### **Backbone**

No additional backbone components are deployed here. Instead the 155 Mbps ATM backbone is further segmented to handle end-user desktops in the three areas handling the day-to-day operations. Although Fast Ethernet switched segments is an over-provisioning of bandwidth for most end-user desktops, the cost differential between 100 Mbps and 10 Mbps speeds is minor and easily overcome during expansion phases. As this is a new implementation this provisioning makes sense.

### **Engineering**

The engineering staff computers are currently composed of four Compaq SP700 dual processor capable workstations with a single 450 MHz Xeon chip and 256 MB SDRAM. The machines exist on their own 100 Mbps switched segment connected directly to the 155 Mbps ATM backbone. This is where the bulk of the website and related support services are maintained. As a result, the engineering staff requires workstations with sufficient resources to support all types of development efforts from custom coding to graphics generation. The segment is serviced by a Compaq ProLiant 3000R dual processor capable server with a single 450 MHz Pentium II chip, 256 MB SDRAM and a 18.2 GB disk. The server is responsible for serving multi-user development environments as described in the corresponding section of the "Software Architecture" document. A HP LaserJet 4500 DN printer and a HP ScanJet 6250 Cxi scanner are available to the engineering staff.

### **Finance**

The finance staff computers are currently composed of two Compaq AP200 Workstations with one 400 MHz Pentium II chip and 64 MB SDRAM. The machines exist on their own 100 Mbps switched segment connected directly to the 155 Mbps ATM backbone. This is where all finance and accounting activities take place. To support the accounting package and associated database, the segment is serviced by a Compaq ProLiant 3000R dual processor capable server with a single 450 MHz Pentium II chip, 256 MB SDRAM and a 18.2 GB disk. For information on the accounting package see the corresponding section of the "Software Architecture" document. A HP LaserJet 4500 DN printer is available to the finance staff.

### **Administration**

The administrative staff computers are currently composed of four Compaq AP200 400 MHz Pentium II chips with 64 MB SDRAM. The machines exist on their own 100 Mbps switched segment connected directly to the 155 Mbps ATM backbone. This is where all administrative activities take place. To support the back office software suite, the segment is serviced by a Compaq ProLiant 3000R dual processor capable server with a single 450 MHz Pentium II chip, 256 MB SDRAM and a 18.2 GB disk. For information on the associated software packages see the corresponding section of the "Software Architecture" document. A HP LaserJet 4500 DN printer is available to the administrative staff.

## Service Center (Reference figure 3)

It would be foolish to assume that we will be operating void of competition. Even if the marketplace does not create a direct competitor, competitors exist in the other forms that compete for our customer's attention. Creating a level of service more in tune with the audience we are trying to attract may be our only differentiator from the customer's perspective. Charging nominal fees for participating in our community may initially cull our intended audience leaving only those that truly want to participate, but customer retention will be an ongoing process. Efficient personal one-on-one interaction with potential and existing customers is extremely important to our overall marketing campaign and more often than not will be the only remaining decision point when customers are choosing which Internet community will best serve them.

Customers look for flexibility and convenience in when, where and how they perform transactions, thus the rampant success of the Internet. So the Service Center will play an important strategic role in providing customer service, but it must do it cost-effectively and it must do it efficiently to keep the number of necessary agents at a minimum. Additionally agents must be able to service all of the customer's needs whether they are communicated by voice, email or fax. Agents must have access to customer account information, service histories and other customer-related information.

To that end, the Service Center takes advantage of converged networking to deliver voice, video and data traffic to the agent desktops via a single network rather than multiple disparate networks. The Service Center topology is designed to enable the company to:

- Enhance customer intimacy and retention.
- Enhance competitiveness by taking advantage of emerging technologies.
- Enhance revenue through broader opportunities to sell.
- Enhance employee productivity by streamlining business processes.

Although there are any more benefits and services provided by this network topology, the overriding motivator is to create a Service Center with great strategic value to the company. By providing a market differentiator through efficient one-on-one interaction and through the accommodation of mixed media communications with our customers, we can realize that goal.

## Backbone

Existing Service Centers utilize a variety of proprietary call service equipment, known as automated call distribution (ACD) servers, which tie a public switched telephone network (PSTN) call to a PC. These servers extract incoming call information, such as the calling ID, passing it to an application running on the PC, which performs the necessary database access. They also provide hold-queue, interactive voice response (IVR), accounting, and monitoring services. ACD servers are expensive and not easily customized to meet customer requirements, and they present significant complexities when deployed in a distributed environment involving multiple Service Center sites.

Consequently, the need to migrate to a converged network solution is significant. Converged networks allow both the telephone call and the caller's service information to arrive at the agent over a common communications fabric. The ACD server is replaced by an ACD application running on a Service Center server that distributes packet voice calls and coordinates them with customer record retrieval. This reduces cost by using standard, off-the-shelf hardware, provides the foundation for more flexible Service Center applications, and naturally allows the Service Center application to be distributed over multiple Service Center sites.

The network topology for the Service Center builds on the backbone servicing the Data Center and takes advantage of the QoS and CoS capabilities of ATM. A second CoreBuilder 7000HD high-density switch with multiple eight-port OC-3 multi-mode modules has been added to create a switched segment servicing the Service Center's demands for bandwidth. Mainly as a cost consideration, the Service Center was deemed to be non-mission-critical and thus the system does not have a redundant high-density switching engine or power supply. The CoreBuilder 7000HD system delivers 155 megabits-per-second (Mbps) ATM links to the Supervisors on the edge and 25 Mbps ATM to the Agent desktops via a ForeRunner LE25 switch.

To provide telecommunications access to the network and to the general employee populace, a dedicated ProLiant 3000R server accepts T1 connections from the IXC/LEC and manages related network and PBX connections. Two T1 lines will be initially provisioned to service the entire employee populace<sup>1</sup>, servicing both Service Center personnel, non-Service Center personnel and fax machines.

*1. Based on the assumption that the company's initial employee populace will number between 12 and 24, the industry rule of thumb to provision 2 lines per employee and the fact that a T1 connection can service 24 lines, two T1 connections will be required.*

### Agents

Every time a customer calls the Service Center or sends an email or fax, we are branding the company in the way we handle it. Agents must be able to carry out any kind of transaction the customer wishes. We can expect to see vast amounts of email and potentially vast amounts of phone calls. The agents will handle all of it at their desktop. They will require visibility into all areas of the company operations including website customer related operations, email handling mechanisms, retail vendor interactions and support vendor interactions. So, we must have the appropriate bandwidth in place. Thus 25 Mbps ATM is run all the way to their desktops via a ForeRunner LE25 switch. Customers calling into a Service Center are used to reliability and performance of the traditional phone network, so it is important that we maintain that level of reliability and performance.

Agent desktops are Compaq AP200 Professional Workstations with Intel Pentium II 400 MHz processors and 64 MB of RAM. Each is equipped with an 25 Mbps ATM NIC from IML that incorporates a phone card for use with a headset or phone. These are highly reliable entry-level machines optimized for multimedia environments of this nature.

### Supervisors

Supervisors have the ability to coach, barge-in and monitor calls being handled by Agents. They also monitor overall system performance and manage system utilization. As result, high bandwidth availability is a must and thus Supervisors are connected directly to the CoreBuilder 7000HD for 155 Mbps access.

Two types of machine service this area. For supervisors, Compaq AP200 Professional Workstations with Intel Pentium II 400 MHz processors and 128 MB of RAM are deployed. Each is equipped with a 155 Mbps ATM NIC from IML that incorporates a phone card for use with a headset or phone. These are highly reliable entry-level machines optimized for multimedia environments of this nature. While the Service Center coordination machine is ProLiant 3000R dual processor capable server with a single 450 MHz Pentium II chip, 512 MB SDRAM and three 18.2 GB disks configured as a RAID 5 array. The ProLiant 3000R machine was chosen for its speed, reliability and ability to upgrade.



## Common

To support the non-Service Center populace and facsimile needs a low-end traditional PBX is deployed. A Coral SL from Tadiran is the PBX of choice. It is designed to meet the needs of small to medium sized businesses and can be configured to handle 200 ports. Initially, it is configured for 24 ports and is connected into network topology via T1 speed links to the dedicated ProLiant 3000R that is accepting T1 connections from the IXC/LEC. It will also have direct connections to the IXC/LEC to support non-Service Center personnel. Thus the entire company, including the Service Center, is on the same telephone network. To handle company voice mail requirements, it is connected to another ProLiant 3000R server that participates in the server pool segment in the Data Center.

The network includes a PBX rather than solely utilizing the IP network, primarily due to the lack of proven IP phones on the market. Although, connections to stand-alone IP based phones are possible, the technology is expensive and unjustifiable at the current time. When the market develops, it may be reasonable to eliminate the PBX and utilize IP based phones that connect directly to the network.

## Conclusion

The only constant in today's marketplace is change. Every day, we will be challenged to deliver better products and service at a lower cost. With a sound back-office support infrastructure, we will be better poised to deliver better service and lower costs to our customers. Operational processes that work just fine now may not be effective tomorrow. We must develop a corporate infrastructure that is powerful enough to handle critical business practices, yet be scalable and flexible enough to grow to meet tomorrow's challenges. This network topology has a high-performance, scalable and flexible core and edge services based primarily on Fast Ethernet technologies to provide fast, simple and cost-effective workgroup connectivity. The topology is designed for inexpensive growth and is provisioned to handle the demands at the website and at the Service Center, the two most important customer interaction points.

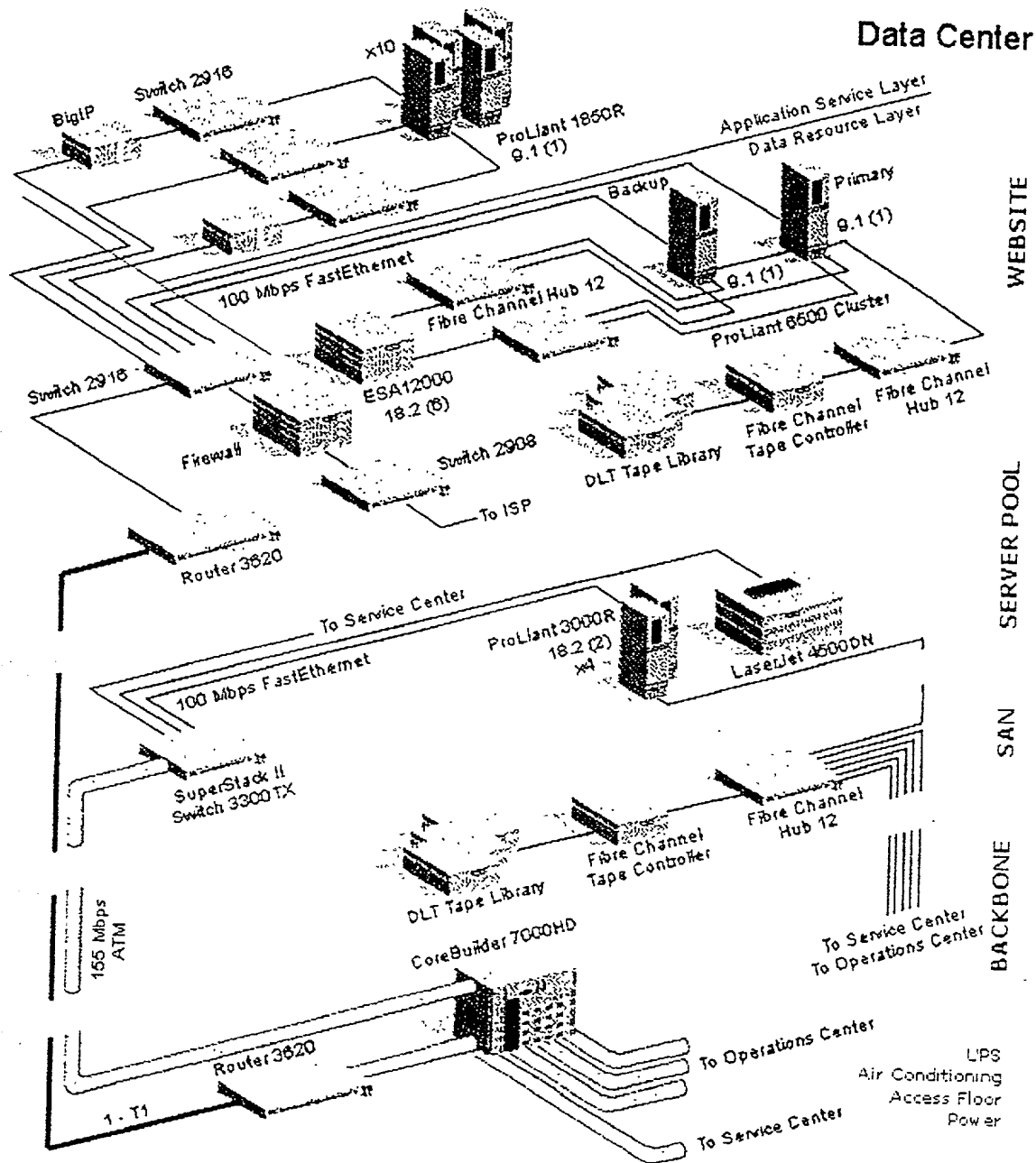


Figure 2. The "Data Center" provides all data support services to the company and to the customers. Those services encompass everything from the website to email to vendor relationships.

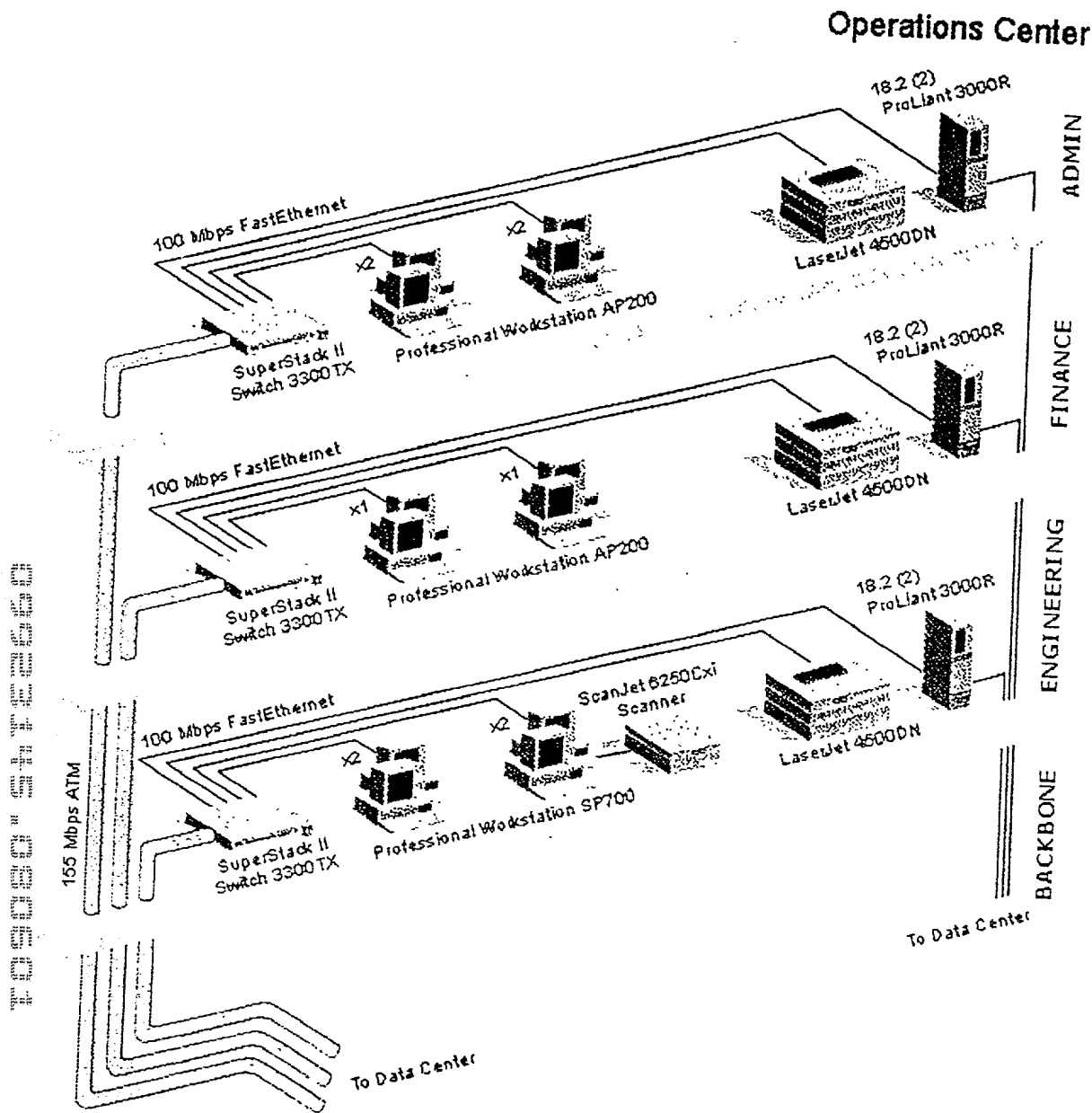


Figure 3. The "Operations Center" is where company administration takes place including marketing, accounting and general operations activities.

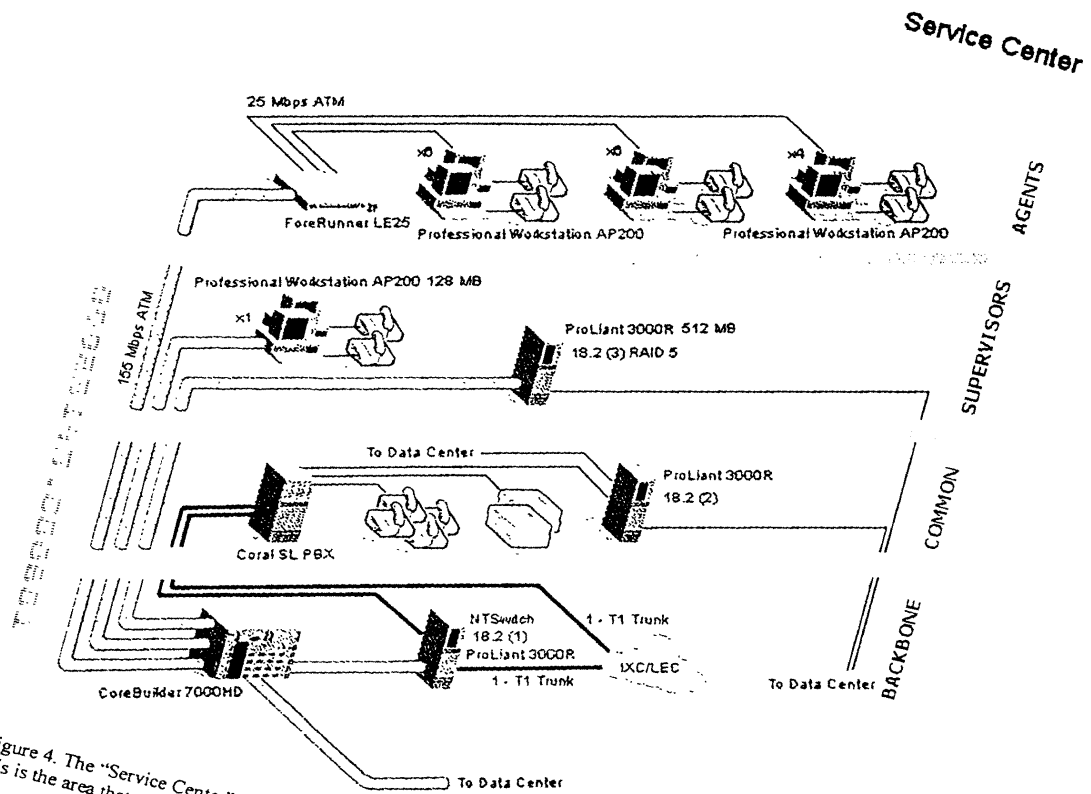


Figure 4. The "Service Center" is where our customers interface with us. Whether those customers are investors or retailers, this is the area that arguably represents the greatest growth potential.

Table 1: Pricing Information

| Product                                                        | Units | Manufacturer | Price       | Extended    |
|----------------------------------------------------------------|-------|--------------|-------------|-------------|
| Symmetra Systems UPS                                           | 1     | APC          | \$20,014.80 | \$20,014.80 |
| Symmetra Systems UPS component                                 | 1     | APC          | \$2,398.80  | \$2,398.80  |
| Symmetra Systems UPS component                                 | 1     | APC          | \$2,398.80  | \$2,398.80  |
| Symmetra Systems UPS component                                 | 4     | APC          | \$576.00    | \$2,304.00  |
| Symmetra Systems UPS                                           | 1     | APC          | \$12,478.80 | \$12,478.80 |
| Airconditioning Unit (free standing - portable)                | 2     | Gree         | \$1,028.40  | \$2,056.80  |
| Access Floor on Concrete w/ Anti-Static Carpet (250sq feet) in | 1     | ConCore      | \$9,900.00  | \$9,900.00  |
| Power Grid (electrical contractor) installed                   | 1     |              | \$3,000.00  | \$3,000.00  |
|                                                                |       |              |             |             |
| BigIP                                                          | 1     | F5 Labs      | \$53,988.00 | \$53,988.00 |
| HA/F500 Enhanced Cluster Kit                                   | 1     | Compaq       | \$5,481.82  | \$5,481.82  |
| Fibre Channel ESA12000 (1 Chassis, 2 RAID Controllers, 60Hz, O | 1     | Compaq       | \$40,542.97 | \$40,542.97 |
| Fibre Channel ACS Controller Software                          | 2     | Compaq       | \$6,000.00  | \$12,000.00 |
| Fibre Channel ESA12000 Platform Kit for WinNT/Intel/PCI        | 2     | Compaq       | \$7,200.00  | \$14,400.00 |
| Fibre Channel WinNT/Intel/PCI Platform Adapters (HBA)          | 4     | Compaq       | \$2,400.00  | \$9,600.00  |
| Fibre Channel Optical Hub 12 Port (No GBICs)                   | 2     | Compaq       | \$7,247.39  | \$14,494.78 |
| Fibre Channel Connection Kit (2 GBICs, 2 Cables)               | 3     | Compaq       | \$1,101.13  | \$3,303.40  |
| Fibre Channel Hub-AL Rack Mount Kit                            | 2     | Compaq       | \$203.60    | \$407.21    |
| Hot Pluggable 18.2 GB 1.6 inch drive                           | 26    | Compaq       | \$2,180.40  | \$56,690.40 |
| Non-Hot Pluggable 9.1 GB 1 inch drive                          | 12    | Compaq       | \$932.12    | \$11,185.49 |
| Fibre Channel Host Adapter Kit                                 | 10    | Compaq       | \$2,118.36  | \$21,183.60 |
| Fibre Channel Storage Hub 12                                   | 1     | Compaq       | \$6,945.94  | \$6,945.94  |
| Fibre Channel Tape Controller                                  | 1     | Compaq       | \$7,403.20  | \$7,403.20  |
| DLT 15 Cartridge Tape Library Model 3570-2                     | 1     | Compaq       | \$25,816.34 | \$25,816.34 |
| DLT Magazine w/ 5 35/70 Tapes                                  | 2     | Compaq       | \$1,000.20  | \$2,000.40  |
| ProLiant 6500 6/450-2 MB Model 2-512                           | 1     | Compaq       | \$33,657.28 | \$33,657.28 |
| ProLiant 6500 6/450-512 KB Model 1-256                         | 1     | Compaq       | \$13,727.00 | \$13,727.00 |
| ProLiant 3000R                                                 | 10    | Compaq       | \$6,334.38  | \$63,343.80 |
| 256-MB Memory Kit buffered SDRAM                               | 9     | Compaq       | \$1,400.38  | \$12,603.38 |
| 512-MB Memory Kit buffered SDRAM                               | 1     | Compaq       | \$4,977.92  | \$4,977.92  |
| ProLiant 1850R 6/450 Model 1                                   | 10    | Compaq       | \$4,437.76  | \$44,377.56 |
| 128 MB Memory Kit buffered SDRAM                               | 10    | Compaq       | \$592.28    | \$5,922.84  |
| Professional Workstation SP700                                 | 4     | Compaq       | \$6,258.00  | \$25,032.00 |
| Professional Workstation AP200                                 | 23    | Compaq       | \$2,031.60  | \$46,726.80 |
| HP Color LaserJet 4500 DN Printer                              | 4     | HP           | \$4,470.00  | \$17,880.00 |
| HP ScanJet 6250 Cxi Color Scanner                              | 1     | HP           | \$598.80    | \$598.80    |
| SuperStack II Switch 630                                       | 3     | 3COM         | \$2,158.80  | \$6,476.40  |
| SuperStack II Switch 3300 TX                                   | 5     | 3COM         | \$4,314.00  | \$21,570.00 |
| ATM OC-3c Multimode Module                                     | 5     | 3COM         | \$2,360.17  | \$11,800.86 |
| FastEthernet PCI NIC (Server)                                  | 41    | 3COM         | \$238.80    | \$9,790.80  |
| FastEthernet PCI NIC (Client)                                  | 10    | 3COM         | \$139.20    | \$1,392.00  |
| PathBuilder S600 Chassis                                       | 1     | 3COM         | \$17,940.00 | \$17,940.00 |
| PathBuilder S600 OC-3c Multimode                               | 1     | 3COM         | \$9,000.00  | \$9,000.00  |
| PathBuilder S600 8-Port UNI w/ IMA T1/E1                       | 2     | 3COM         | \$15,000.00 | \$30,000.00 |
| PathBuilder S600 Software                                      | 1     | 3COM         | \$6,000.00  | \$6,000.00  |
| CoreBuilder 7000HD Chassis                                     | 2     | 3COM         | \$28,680.00 | \$57,360.00 |

|                                                                 |    |              |             |              |
|-----------------------------------------------------------------|----|--------------|-------------|--------------|
| CoreBuilder 7000HD 2nd Engine                                   | 1  | 3COM         | \$19,200.00 | \$19,200.00  |
| CoreBuilder 7000HD 2nd Power Supply                             | 1  | 3COM         | \$2,640.00  | \$2,640.00   |
| CoreBuilder 7000HD ATM OC-3c Multimode 8-Port                   | 3  | 3COM         | \$14,400.00 | \$43,200.00  |
| CoreBuilder 7000HD 32MB Upgrade                                 | 2  | 3COM         | \$3,000.00  | \$6,000.00   |
| CoreBuilder 7000HD Upgrade Kit                                  | 3  | 3COM         | \$1,440.00  | \$4,320.00   |
| CoreBuilder 7000HD Transcend Control (NT)                       | 1  | 3COM         | \$11,394.00 | \$11,394.00  |
| ATMLink PCI NIC (Multimode Fiber)                               | 1  | 3COM         | \$834.00    | \$834.00     |
| ForeRunner LE 25 (24 - 25 Mbps, 2 - 155 Mbps MMF, 2 - 55 Mbps S | 1  | Fore Systems | \$7,485.19  | \$7,485.19   |
| ForeRunner LE 25 Switch Rack and Stack Mount Kit                | 1  | Fore Systems | \$96.00     | \$96.00      |
|                                                                 |    |              |             |              |
| IML 155 Mbps ATM NIC and Digital Phone                          | 1  | IML          | \$600.00    | \$600.00     |
| IML 25 Mbps ATM NIC and Digital Phone                           | 16 | IML          | \$600.00    | \$9,600.00   |
| Headsets                                                        | 16 |              | \$360.00    | \$5,760.00   |
| Coral SL (configured as 24 port)                                | 1  | Tadiran      | \$10,800.00 | \$10,800.00  |
| Coral SL (Phone Set Card - 8 Ports)                             | 3  | Tadiran      | \$2,400.00  | \$7,200.00   |
| Coral SL (T1 Card for IXC/LEC)                                  | 2  | Tadiran      | \$3,840.00  | \$7,680.00   |
| Coral SL (Analog Card for Voicemail Connection)                 | 1  | Tadiran      | \$600.00    | \$600.00     |
| Coral SL (Phone)                                                | 24 | Tadiran      | \$300.00    | \$7,200.00   |
| Fax                                                             | 2  |              | \$480.00    | \$960.00     |
|                                                                 |    |              |             |              |
| Cabling - MicroChannel Multimode Fiber 50/125 (5m)              | 10 | Compaq       | \$133.80    | \$1,338.00   |
| Cabling - Multimode Fiber 62.5/125 Duplex SC-SC (5m)            | 15 | NuData       | \$83.99     | \$1,259.82   |
| Cabling - Multimode Fiber 62.5/125 Duplex SC-SC (50m)           | 6  | NuData       | \$231.00    | \$1,386.00   |
| Cabling - Enhanced Category 5 (1000' roll)                      | 4  | Belden       | \$418.80    | \$1,675.20   |
| Cabling - Enhanced Category 5 (RJ45 8C Cat 5 Shielded Connecto  | 2  | NuData       | \$143.40    | \$286.80     |
| Cabling - TieWraps (100 pack)                                   | 5  | NuData       | \$7.19      | \$35.94      |
| Cabling - Delivery System                                       | 1  | MediaTrak    | \$6,000.00  | \$6,000.00   |
|                                                                 |    |              |             |              |
| Rack 4000 (36U)                                                 | 7  | Compaq       | \$1,713.60  | \$11,995.20  |
| Rack 4000 Coupling Kit                                          | 6  | Compaq       | \$69.00     | \$414.00     |
| Rack 4000 Sidewall Panel Kit                                    | 1  | Compaq       | \$200.40    | \$200.40     |
| Rack 4000 Stabilizing Feet                                      | 7  | Compaq       | \$163.80    | \$1,146.60   |
| Flat Panel Monitor Rackmount (TFT450R)                          | 7  | Compaq       | \$1,627.20  | \$11,390.40  |
| Power Distribution Unit (low voltage 12 Recepticle)             | 7  | Compaq       | \$377.40    | \$2,641.80   |
| Power Distribution Unit (high voltage 12 Recepticle)            | 7  | Compaq       | \$352.20    | \$2,465.40   |
| Sliding Shelf Kit                                               | 7  | Compaq       | \$332.40    | \$2,326.80   |
| Depth Adjustable Fixed Rail Kit                                 | 14 | Compaq       | \$73.44     | \$1,028.16   |
| Keyboard Drawer Kit                                             | 7  | Compaq       | \$341.40    | \$2,389.80   |
| Internal Keyboard w/ Trackball                                  | 7  | Compaq       | \$195.00    | \$1,365.00   |
| Keyboard/Monitor/Mouse Switch Box (8-Port)                      | 8  | Compaq       | \$1,360.60  | \$10,884.77  |
|                                                                 |    |              |             |              |
|                                                                 |    |              |             | \$985,972.25 |

## Preface

This document summarizes the complete off-the-shelf software requirements necessary to support all business operations and directly corresponds to the document entitled "Hardware Architecture - Basic Topology and Costing Information". Its purpose is to present an ideal solution which takes into account our expected short-term and long-term growth while leveraging only proven technologies based on solid standards and industry support. The products composing the topology were selected based on price-performance considerations and in most cases reflect the lowest price. However, in some cases performance and requirements coverage outweighed price. The topology has been designed to provide an easy cheap expansion to service the explosive growth potential of this effort and as a direct result the topology exceeds our startup needs. The cost differential will be more than covered during service expansion phases by allowing us to leverage our then existing infrastructure instead of forcing us to throw away, re-deploy and retrain.

Note that this document does not specify costing information for custom software applications or website content. Please see the document entitled "Custom Software - Website, Vendor Interaction and Customer Service".

## Discourse

The business operations of this effort can be broken down into three main technologically focused areas. First, is the "Data Center" which provides all data support services to the company and to the customers. Those services encompass everything from the website to email to vendor relationships. Second, is the "Operations Center" which is where company administration takes place including marketing, accounting and general operations activities. Finally, the "Service Center" area is where our customers interface with the company. Whether those customers are investors or retailers, this is the area that arguably represents the greatest growth potential. No matter how effective our website is in answering customer needs, a customer base of potentially millions will make one-on-one customer interaction our biggest problem and potentially our biggest competitive advantage.

The software packages listed in this document were selected to support the following general areas of company operations:

- **Website Services** - website content development, delivery, maintenance and hosting are covered in this area. Applications supporting website testing and analysis are also folded in under this area.
- **Vendor Interaction** - retail and support vendor technological interaction is covered in this area.
- **Data Management** - database support activities, document management and contact management are covered in this area. The unification of voice, data, and fax message delivery are also folded in under this area.
- **Telephony Management** - inbound/outbound call center voice traffic, inbound/outbound non-call center voice traffic and inbound/outbound fax traffic are cover in this area. Voice-mail, IVR, auto-attendant and fax-back services are also folded in under this area.
- **Systems Management** - security management, network management, desktop management, application management and backup/recovery operations are covered in this area. Help desk operations and virus protection are also folded in under this area.
- **Finance Management** - general accounting and payroll activities are covered in this area.
- **Personnel Management** - human resources, benefits administration and general employee record keeping are covered in this area.



- **Productivity Provisioning** - word processing, spreadsheet capabilities, schedule maintenance, project management are covered in this area. End-user communications and general query capabilities are also folded in under this area.

The following sections list, and in some cases provide brief discussions about, the software packages and their associated requirements-coverage. Where required, deployment costs and maintenance contract costs are included.

## Data Center

### Backbone

| Product                     | Units | Manufacturer | Price       | Extended    |
|-----------------------------|-------|--------------|-------------|-------------|
| Unicenter TNG 2.1 Workgroup | 1     | CA           | \$29,994.00 | \$29,994.00 |
|                             |       |              |             | \$29,994.00 |

Unicenter TNG provides a rich set of enterprise management functions, built on top of a flexible infrastructure. It allows any system or service to be integrated into its management framework, without arbitrary limitations. The solution is complemented by a wide range of solutions from 3<sup>rd</sup> party vendors and is arguably a de facto standard. The flexible infrastructure is extensible allowing us to customize and extend it to meet our special needs.

### SAN

|                 |   |    |            |            |
|-----------------|---|----|------------|------------|
| ArcServerIT 6.6 | 1 | CA | \$8,394.00 | \$8,394.00 |
|                 |   |    |            | \$8,394.00 |

ArcServerIT automates every traditional storage management task, lowers operating expenses, reduces errors, and enables us to easily perform essential data protection routines. We can manage virtually any aspect of the backup and restore operation anywhere on the network from one central location providing fast, efficient operation without hindering mission-critical operations.

### Server Pool

|                                                                |   |           |            |             |
|----------------------------------------------------------------|---|-----------|------------|-------------|
| Microsoft Windows NT Server 4.0                                | 5 | Microsoft | \$970.80   | \$4,854.00  |
| Microsoft Exchange Server 5.5 Enterprise Edition (25 Licenses) | 1 | Microsoft | \$4,258.80 | \$4,258.80  |
| Microsoft SQL Server 7.0 (10 Licenses)                         | 4 | Microsoft | \$2,398.80 | \$9,595.20  |
| FileNet Watermark Image Server                                 | 1 | FileNet   | \$9,000.00 | \$9,000.00  |
| FileNet Watermark Client (25 Licenses)                         | 1 | FileNet   | \$7,074.00 | \$7,074.00  |
| FileNet Watermark Client Access (25 Licenses)                  | 1 | FileNet   | \$4,794.00 | \$4,794.00  |
| FileNet Watermark Fax Router                                   | 1 | FileNet   | \$2,394.00 | \$2,394.00  |
| FileNet Watermark Developer's Kit                              | 1 | FileNet   | \$4,794.00 | \$4,794.00  |
| FileNet Watermark 1 Year Subscription                          | 1 | FileNet   | \$5,611.20 | \$5,611.20  |
| Seagate Crystal Reports Pro 7.0                                | 1 | Seagate   | \$570.00   | \$570.00    |
| Seagate Crystal Reports Pro 7.0 Client (5 Licenses)            | 2 | Seagate   | \$1,242.34 | \$2,484.67  |
|                                                                |   |           |            | \$55,429.87 |

The Watermark solution is a family of products that will provide us with easy to use, powerful and customizable document imaging and workflow capabilities. Data objects are managed centrally in secure network storage and can be retrieved, routed and managed by anyone (with appropriate user rights) in the company. Essentially, a central repository of all company information, not matter its form, can be maintained – regardless of whether that information is composed of documents, scanned images, email, faxes or voicemail.

Crystal Reports is a database access and analysis tool that will allow us to create customizable presentation-quality reports from virtually any database and for virtually any purpose – whether IT or management related. It provides flexible analysis and formatting capabilities and advanced interactive reporting over the Web.

## Website

| Application Service Layer                                          |    |           |            |             |
|--------------------------------------------------------------------|----|-----------|------------|-------------|
| Microsoft Windows NT Server 4.0                                    | 10 | Microsoft | \$970.80   | \$9,708.00  |
| Microsoft Windows NT Service Pack 3                                | 10 | Microsoft | \$0.00     | \$0.00      |
| Microsoft Option Pack 4.0                                          | 10 | Microsoft | \$0.00     | \$0.00      |
| Microsoft Site Server 3.0 Commerce Edition (25 Licenses)           | 1  | Microsoft | \$5,530.80 | \$5,530.80  |
| Microsoft Site Server 3.0 Client Access License Pack (20 Licenses) | 1  | Microsoft | \$1,006.80 | \$1,006.80  |
| Microsoft Site Server 3.0 Internet Connector License Pack          | 1  | Microsoft | \$3,598.80 | \$3,598.80  |
| ColdFusion Server 4.0 Professional                                 | 10 | Alliare   | \$1,554.00 | \$15,540.00 |
| ColdFusion Server 4.0 Forums                                       | 10 | Alliare   | \$474.00   | \$4,740.00  |
| ColdFusion Server 4.0 1 Year Subscription                          | 10 | Alliare   | \$390.00   | \$3,900.00  |
|                                                                    |    |           |            | \$44,024.40 |

The ColdFusion Server will be deployed as a scalable robust solution to provide connectivity between our website and the back-end customer transaction databases. The server is a proven technology designed to support our bandwidth and reliability requirements.

| Data Resource Layer                                          |   |           |            |             |
|--------------------------------------------------------------|---|-----------|------------|-------------|
| Microsoft Windows NT 4.0 Enterprise Edition                  | 2 | Microsoft | \$4,798.80 | \$9,597.60  |
| Microsoft Windows NT Service Pack 3 (included w/ Enterprise) | 2 | Microsoft | \$0.00     | \$0.00      |
| Microsoft SQL Server 6.5 Enterprise Edition                  | 0 | Microsoft | \$0.00     | \$0.00      |
| Microsoft SQL Server Service Pack 4                          | 0 | Microsoft | \$0.00     | \$0.00      |
| Updated SQL 6.5 Database Engine (included with Site Server)  | 0 | Microsoft | \$0.00     | \$0.00      |
| Microsoft SQL Server 7.0 Enterprise Edition                  | 2 | Microsoft | \$9,610.80 | \$19,221.60 |
| CyberCash CashRegister 3.0 Merchant Connection Kit           | 2 | CyberCash | \$1,194.00 | \$2,388.00  |
|                                                              |   |           |            | \$31,207.20 |

## Operations Center

### Backbone

|                                         |    |           |             |             |
|-----------------------------------------|----|-----------|-------------|-------------|
| Microsoft Windows 98                    | 10 | Microsoft | \$250.80    | \$2,508.00  |
| Microsoft Office Standard Edition       | 10 | Microsoft | \$598.80    | \$5,988.00  |
| Microsoft Project 98                    | 10 | Microsoft | \$598.80    | \$5,988.00  |
| Microsoft Internet Explorer             | 10 | Microsoft | \$0.00      | \$0.00      |
| Microsoft Windows NT Server 4.0         | 3  | Microsoft | \$970.80    | \$2,912.40  |
| Microsoft SQL Server 7.0 (10 Licenses)  | 3  | Microsoft | \$2,398.80  | \$7,196.40  |
| Miscellaneous Applications (Unforeseen) | 1  | unknown   | \$12,000.00 | \$12,000.00 |
|                                         |    |           |             | \$36,592.80 |

At each non-Service Center desktop a suite of tools from Microsoft will be deployed to cover everyday productivity needs. Whether we're creating documents, assembling and analyzing information, communicating with customers, or publishing marketing materials, it is these tools that will help us do the bulk of the everyday work.

### Engineering

|                                                 |   |            |            |             |
|-------------------------------------------------|---|------------|------------|-------------|
| ColdFusion Studio 4.0                           | 5 | Alliare    | \$474.00   | \$2,370.00  |
| ColdFusion Studio 4.0 1 Year Subscription       | 5 | Alliare    | \$118.80   | \$594.00    |
| Microsoft Office Developer Edition 97 Win32     | 5 | Microsoft  | \$958.80   | \$4,794.00  |
| Microsoft Visual Studio 6.0 Enterprise Edition  | 5 | Microsoft  | \$1,942.80 | \$9,714.00  |
| Adobe PhotoShop 5.0                             | 5 | Adobe      | \$731.03   | \$3,655.14  |
| Macromedia Freehand 8.0                         | 5 | Macromedia | \$454.80   | \$2,274.00  |
| Macromedia Fontographer 4.1                     | 5 | Macromedia | \$383.46   | \$1,917.30  |
| Macromedia Authorware 5 Attain 5                | 5 | Macromedia | \$3,203.36 | \$16,016.82 |
| Macromedia Dreamweaver 2.0                      | 5 | Macromedia | \$335.20   | \$1,675.98  |
| Macromedia Director 7 Shockwave Internet Studio | 5 | Macromedia | \$1,125.29 | \$5,626.44  |
| Macromedia Flash 3.0                            | 5 | Macromedia | \$331.81   | \$1,659.06  |
| Macromedia Director Studio                      | 5 | Macromedia | \$1,078.67 | \$5,393.34  |
| RealAudio RealProducer Pro G2                   | 5 | RealAudio  | \$598.80   | \$2,994.00  |
|                                                 |   |            |            | \$58,684.08 |

ColdFusion Studio is a visual development tool used to take full advantage of the ColdFusion server. It is through this tool that the bulk of the web content will be packaged and interfaced with the back-end database.

The suite of development tools from Microsoft will be deployed to provide our in-house development staff with the ability to create custom software solutions to meet both in-house and website related needs. The tool set is tightly integrated with all of our back-end systems both at the Data Center and at the desktop and will give us significant flexibility in integrating off-the-shelf software packages with our custom applications.

Macromedia offers a suite of tools that we will leverage to create rich, immersive multimedia content for our website. It is these tools that will allow us to create compelling animations and illustrations in the web pages themselves and to develop learning oriented products that can be delivered from the web pages to member desktops.

## Finance

|                         |   |             |             |             |
|-------------------------|---|-------------|-------------|-------------|
| Great Plains Accounting | 1 | GreatPlains | \$17,994.00 | \$17,994.00 |
|                         |   |             |             | \$17,994.00 |

As a fully programmable package, the Great Plains business management software solution will be deployed to meet our existing and potential requirements for the management of financials, distribution, human resources, manufacturing, service management, and enterprise reporting. By delivering decision-driving information with a seamlessly integrated business management solution that is used across our entire organization, we'll be able significantly improve our chances of long-term business success. The Great Plains solution can do just that and is a component based solution that can be cost-effectively deployed at start-up and can grow with us for some time.

## Administration

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## Service Center

### Backbone

|                                                                |    |           |              |              |
|----------------------------------------------------------------|----|-----------|--------------|--------------|
| Microsoft Windows NT Workstation 4.0                           | 16 | Microsoft | \$382.80     | \$6,124.80   |
| Microsoft Office Standard Edition                              | 16 | Microsoft | \$598.80     | \$9,580.80   |
| Microsoft Internet Explorer                                    | 16 | Microsoft | \$0.00       | \$0.00       |
| Microsoft Windows NT Server 4.0                                | 2  | Microsoft | \$970.80     | \$1,941.60   |
| CellIt Software Suite (16 Licenses)                            | 1  | CellIt    | \$108,016.80 | \$108,016.80 |
| CellIt Installation (16 Seats)                                 | 1  | CellIt    | \$14,400.00  | \$14,400.00  |
| CellIt 1 Year Subscription                                     | 1  | CellIt    | \$20,400.00  | \$20,400.00  |
| RightFAX Enterprise Suite 6.0 I                                | 1  | RightFAX  | \$10,630.80  | \$10,630.80  |
| RightFAX Enterprise Suite 6.0 1 Year Subscription              | 1  | RightFAX  | \$2,126.16   | \$2,126.16   |
| Internet Message Center Enterprise Edition Server              | 1  | Mustang   | \$12,000.00  | \$12,000.00  |
| Internet Message Center Enterprise Edition Client              | 16 | Mustang   | \$300.00     | \$4,800.00   |
| Internet Message Center Enterprise Edition 1 Year Subscription | 1  | Mustang   | \$3,360.00   | \$3,360.00   |
|                                                                |    |           |              | \$193,380.96 |

The unified call center solution from CELLIT will be deployed to service the convergence of voice, video and data in our broadband environment. It is based on an open-systems architecture and internationally recognized standards that will allow us to incorporate "best-of-breed" products and development tools to rapidly introduce a powerful and flexible solution into our architecture. The CELLIT solution includes a complete call center feature set which takes the place of the traditionally closed PBX and ACD systems as well as peripheral systems such as predictive dialers and call loggers.

The RightFAX product is a server-based fax solution that will allow our end-users to send and receive faxes directly from their desktops. By leveraging and integrating seamlessly with Microsoft Outlook and Microsoft SQL Server, the product suite acts like an ACD system for faxes. It is through this solution that our Service Center personnel will efficiently handle inbound and outbound customer-oriented faxes.

Internet Message Center will be deployed to automatically route incoming customer related email messages to the Service Center personnel best equipped to answer them quickly and efficiently. The solution acts as an ACD system for email, by routing messages based on address and key words and handles activities like automatic replies and internal tracking to insure that interaction with our customers is both timely and appropriate.

### Agents

.....

### Supervisors

.....

## Common

|                                     |    |          |             |             |
|-------------------------------------|----|----------|-------------|-------------|
| TeleVantage 2.1 Server              | 1  | Artisoft | \$900.00    | \$900.00    |
| TeleVantage 2.1 Trunk               | 2  | Artisoft | \$240.00    | \$480.00    |
| TeleVantage 2.1 Station             | 24 | Artisoft | \$240.00    | \$5,760.00  |
| TeleVantage 2.1 Client              | 24 | Artisoft | \$240.00    | \$5,760.00  |
| TeleVantage 2.1 Boards              | 1  | Artisoft | \$21,000.00 | \$21,000.00 |
| TeleVantage 2.1 1 Year Subscription | 1  | Artisoft | \$2,580.00  | \$2,580.00  |
| Visual Voice Pro (24 Licenses)      | 1  | Artisoft | \$13,800.00 | \$13,800.00 |
| Visual Voice for TAPI               | 1  | Artisoft | \$3,000.00  | \$3,000.00  |
|                                     |    |          |             | \$53,280.00 |

The Artisoft products, TeleVantage and Visual Voice Pro, will be deployed as a robust and comprehensive voice mail system providing features like Interactive Voice Response, personal greetings, passwords and the ability to return calls without looking up phone numbers. As an application tightly integrated with Microsoft Outlook, TeleVantage will allow us to handle voicemail in the same manner and through the same interface that we handle email.

## Conclusion

With a sound back-office software infrastructure, we will be poised to deliver better service and lower costs to our customers. The proceeding applications represent an off-the-shelf deployment that will foster the information exchange necessary to meet our business objectives. Efficient interaction among staff and between our customers and us is of paramount importance in creating an environment of success. The proper mix of existing application suites and custom software will create the necessary corporate infrastructure to enable us to both facilitate and manage company-wide growth.

|                                 |
|---------------------------------|
| Total Off-The Shelf Investment: |
|---------------------------------|

|              |
|--------------|
| \$528,981.31 |
|--------------|



esolis.com

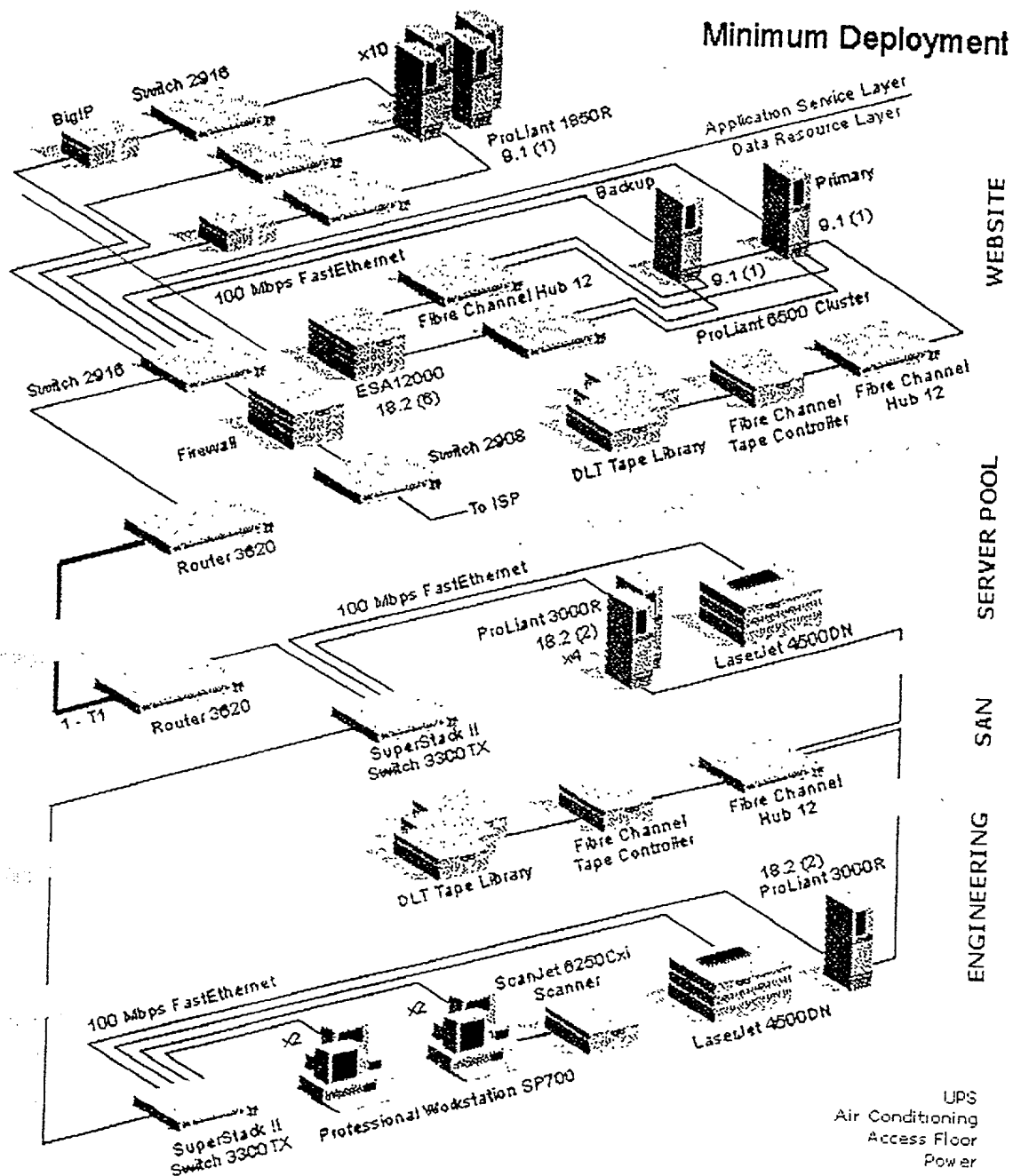


Figure 1. The phase 1 deployment necessary to support efforts by esolis.com in building its primary channel of customer interaction.

| Product                                                                | Units | Manufacturer | Price     | Ext         |
|------------------------------------------------------------------------|-------|--------------|-----------|-------------|
| Symmetra Systems UPS                                                   | 1     | APC          | 20,014.80 | \$20,014.80 |
| Symmetra Systems UPS component                                         | 1     | APC          | 2,398.80  | \$2,398.80  |
| Symmetra Systems UPS component                                         | 1     | APC          | 2,398.80  | \$2,398.80  |
| Symmetra Systems UPS component                                         | 4     | APC          | 576.00    | \$2,304.00  |
| Symmetra Systems UPS                                                   | 1     | APC          | 12,478.80 | \$12,478.80 |
| Airconditioning Unit (free standing - portable)                        | 2     | Gree         | 1,028.40  | \$2,056.80  |
| Access Floor on Concrete w/ Anti-Static Carpet (250sq feet) installed  | 1     | ConCore      | 9,900.00  | \$9,900.00  |
| Power Grid (electrical contractor) installed                           | 1     |              | 3,000.00  | \$3,000.00  |
| BigIP                                                                  | 1     | F5 Labs      | 53,988.00 | \$53,988.00 |
| HA/F500 Enhanced Cluster Kit                                           | 1     | Compaq       | 5,481.82  | \$5,481.82  |
| Fibre Channel ESA12000 (1 Chassis, 2 RAID Controllers, 60Hz, Opal)     | 1     | Compaq       | 40,542.97 | \$40,542.97 |
| Fibre Channel ACS Controller Software                                  | 2     | Compaq       | 6,000.00  | \$12,000.00 |
| Fibre Channel ESA12000 Platform Kit for WinNT/Intel/PCI                | 2     | Compaq       | 7,200.00  | \$14,400.00 |
| Fibre Channel WinNT/Intel/PCI Platform Adapters (HBA)                  | 4     | Compaq       | 2,400.00  | \$9,600.00  |
| Fibre Channel Optical Hub 12 Port (No GBICs)                           | 2     | Compaq       | 7,247.39  | \$14,494.78 |
| Fibre Channel Connection Kit (2 GBICs, 2 Cables)                       | 3     | Compaq       | 1,101.13  | \$3,303.39  |
| Fibre Channel Hub-AL Rack Mount Kit                                    | 2     | Compaq       | 203.60    | \$407.20    |
| Hot Pluggable 18.2 GB 1.6 inch drive                                   | 16    | Compaq       | 2,180.40  | \$34,886.40 |
| Non-Hot Pluggable 9.1 GB 1 inch drive                                  | 12    | Compaq       | 932.12    | \$11,185.44 |
| Fibre Channel Host Adapter Kit                                         | 10    | Compaq       | 2,118.36  | \$21,183.60 |
| Fibre Channel Storage Hub 12                                           | 1     | Compaq       | 6,945.94  | \$6,945.94  |
| Fibre Channel Tape Controller                                          | 1     | Compaq       | 7,403.20  | \$7,403.20  |
| DLT 15 Cartridge Tape Library Model 3570-2                             | 1     | Compaq       | 25,816.34 | \$25,816.34 |
| DLT Magazine w/ 5 35/70 Tapes                                          | 2     | Compaq       | 1,000.20  | \$2,000.40  |
| ProLiant 6500 6/450-2 MB Model 2-512                                   | 1     | Compaq       | 33,657.28 | \$33,657.28 |
| ProLiant 6500 6/450-512 KB Model 1-256                                 | 1     | Compaq       | 13,727.00 | \$13,727.00 |
| ProLiant 3000R                                                         | 5     | Compaq       | 6,334.38  | \$31,671.90 |
| 256-MB Memory Kit buffered SDRAM                                       | 9     | Compaq       | 1,400.38  | \$12,603.42 |
| 512-MB Memory Kit buffered SDRAM                                       | 1     | Compaq       | 4,977.92  | \$4,977.92  |
| ProLiant 1850R 6/450 Model 1                                           | 10    | Compaq       | 4,437.76  | \$44,377.60 |
| 128 MB Memory Kit buffered SDRAM                                       | 10    | Compaq       | 592.28    | \$5,922.80  |
| Professional Workstation SP700                                         | 4     | Compaq       | 6,258.00  | \$25,032.00 |
| HP Color LaserJet 4500 DN Printer                                      | 2     | HP           | 4,470.00  | \$8,940.00  |
| HP ScanJet 6250 Cxi Color Scanner                                      | 1     | HP           | 598.80    | \$598.80    |
| SuperStack II Switch 630                                               | 3     | 3COM         | 2,158.80  | \$6,476.40  |
| SuperStack II Switch 3300 TX                                           | 2     | 3COM         | 4,314.00  | \$8,628.00  |
| FastEthernet PCI NIC (Server)                                          | 36    | 3COM         | 238.80    | \$8,596.80  |
| FastEthernet PCI NIC (Client)                                          | 4     | 3COM         | 139.20    | \$556.80    |
| Cabling - MicroChannel Multimode Fiber 50/125 (5m)                     | 10    | Compaq       | 133.80    | \$1,338.00  |
| Cabling - Multimode Fiber 62.5/125 Duplex SC-SC (5m)                   | 15    | NuData       | 83.99     | \$1,259.85  |
| Cabling - Multimode Fiber 62.5/125 Duplex SC-SC (50m)                  | 6     | NuData       | 231.00    | \$1,386.00  |
| Cabling - Enhanced Category 5 (1000' roll)                             | 4     | Belden       | 418.80    | \$1,675.20  |
| Cabling - Enhanced Category 5 (RJ45 8C Cat 5 Shielded Connectors - 50) | 2     | NuData       | 143.40    | \$286.80    |
| Cabling - TieWraps (100 pack)                                          | 5     | NuData       | 7.19      | \$35.95     |
| Cabling - Delivery System                                              | 1     | MediaTrak    | 6,000.00  | \$6,000.00  |

[illegible]

|           |          |         |
|-----------|----------|---------|
| 5 Compaq  | 1,713.60 | \$8,5   |
| 4 Compaq  | 69.00    | \$2     |
| 1 Compaq  | 200.40   | \$2     |
| 7 Compaq  | 163.80   | \$1,1-  |
| 5 Compaq  | 1,627.20 | \$8,1   |
| 5 Compaq  | 377.40   | \$1,88  |
| 5 Compaq  | 352.20   | \$1,76  |
| 5 Compaq  | 332.40   | \$1,66  |
| 10 Compaq | 73.44    | \$70    |
| 5 Compaq  | 341.40   | \$1,70  |
| 5 Compaq  | 195.00   | \$97    |
| 8 Compaq  | 1,360.60 | \$10,88 |

Total: \$573,87

| Product                                                               | Units | Manufacturer | Price       | Ext      |
|-----------------------------------------------------------------------|-------|--------------|-------------|----------|
| <b>Data Center</b>                                                    |       |              |             |          |
| <b>Application Service Layer</b>                                      |       |              |             |          |
| Microsoft Windows NT Server 4.0                                       | 10    | Microsoft    | \$970.80    | \$9,708  |
| Microsoft Windows NT Service Pack 3                                   | 10    | Microsoft    | \$0.00      | \$0      |
| Microsoft Option Pack 4.0                                             | 10    | Microsoft    | \$0.00      | \$0      |
| Microsoft Site Server 3.0 Commerce Edition (25 Licenses)              | 1     | Microsoft    | \$5,530.80  | \$5,530  |
| Microsoft Site Server 3.0 Client Access License Pack (20 Licenses)    | 1     | Microsoft    | \$1,006.80  | \$1,006  |
| Microsoft Site Server 3.0 Internet Connector License Pack (Unlimited) | 1     | Microsoft    | \$3,598.80  | \$3,598  |
| ColdFusion Server 4.0 Professional                                    | 10    | Alliart      | \$1,554.00  | \$15,540 |
| ColdFusion Server 4.0 Forums                                          | 10    | Alliart      | \$474.00    | \$4,740  |
| ColdFusion Server 4.0 1 Year Subscription                             | 10    | Alliart      | \$390.00    | \$3,900  |
| <b>Data Resource Layer</b>                                            |       |              |             |          |
| Microsoft Windows NT 4.0 Enterprise Edition                           | 2     | Microsoft    | \$4,798.80  | \$9,597  |
| Microsoft Windows NT Service Pack 3 (included w/ Enterprise Edition)  | 2     | Microsoft    | \$0.00      | \$0      |
| Microsoft SQL Server 6.5 Enterprise Edition                           | 0     | Microsoft    | \$0.00      | \$0      |
| Microsoft SQL Server Service Pack 4                                   | 0     | Microsoft    | \$0.00      | \$0      |
| Updated SQL 6.5 Database Engine (included with Site Server)           | 0     | Microsoft    | \$0.00      | \$0      |
| Microsoft SQL Server 7.0 Enterprise Edition                           | 2     | Microsoft    | \$9,610.80  | \$19,221 |
| CyberCash CashRegister 3.0 Merchant Connection Kit                    | 2     | CyberCash    | \$1,194.00  | \$2,388  |
| <b>Server Pool</b>                                                    |       |              |             |          |
| Microsoft Windows NT Server 4.0                                       | 5     | Microsoft    | \$970.80    | \$4,854  |
| Microsoft Exchange Server 5.5 Enterprise Edition (25 Licenses)        | 1     | Microsoft    | \$4,258.80  | \$4,258  |
| Microsoft SQL Server 7.0 (10 Licenses)                                | 4     | Microsoft    | \$2,398.80  | \$9,595  |
| Seagate Crystal Reports Pro 7.0                                       | 1     | Seagate      | \$570.00    | \$570    |
| Seagate Crystal Reports Pro 7.0 Client (5 Licenses)                   | 2     | Seagate      | \$1,242.34  | \$2,484  |
| <b>SAN</b>                                                            |       |              |             |          |
| ArcServerIT 6.6                                                       | 1     | CA           | \$8,394.00  | \$8,394  |
| <b>Backbone</b>                                                       |       |              |             |          |
| Unicenter TNG 2.1 Workgroup                                           | 1     | CA           | \$29,994.00 | \$29,994 |
| <b>Operations Center</b>                                              |       |              |             |          |
| <b>Administration</b>                                                 |       |              |             |          |
| ...                                                                   |       |              |             |          |
| <b>Finance</b>                                                        |       |              |             |          |
| ...                                                                   |       |              |             |          |

### Engineering

|                                                 |              |            |          |
|-------------------------------------------------|--------------|------------|----------|
| ColdFusion Studio 4.0                           | 5 Allaire    | \$474.00   | \$2,370  |
| ColdFusion Studio 4.0 1 Year Subscription       | 5 Allaire    | \$118.80   | \$594    |
| Microsoft Office Developer Edition 97 Win32     | 5 Microsoft  | \$958.80   | \$4,794  |
| Microsoft Visual Studio 6.0 Enterprise Edition  | 5 Microsoft  | \$1,942.80 | \$9,714  |
| Adobe Photoshop 5.0                             | 5 Adobe      | \$731.03   | \$3,655  |
| Macromedia Freehand 8.0                         | 5 Macromedia | \$454.80   | \$2,274  |
| Macromedia Fontographer 4.1                     | 5 Macromedia | \$383.46   | \$1,917  |
| Macromedia Authorware 5 Attain 5                | 5 Macromedia | \$3,203.36 | \$16,016 |
| Macromedia Dreamweaver 2.0                      | 5 Macromedia | \$335.20   | \$1,675  |
| Macromedia Director 7 Shockwave Internet Studio | 5 Macromedia | \$1,125.29 | \$5,626  |
| Macromedia Flash 3.0                            | 5 Macromedia | \$331.81   | \$1,659  |
| Macromedia Director Studio                      | 5 Macromedia | \$1,078.67 | \$5,393  |
| RealAudio RealProducer Pro G2                   | 5 RealAudio  | \$598.80   | \$2,994  |

### Backbone

|                                         |             |             |          |
|-----------------------------------------|-------------|-------------|----------|
| Microsoft Windows 98                    | 5 Microsoft | \$250.80    | \$1,254  |
| Microsoft Office Standard Edition       | 5 Microsoft | \$598.80    | \$2,994  |
| Microsoft Project 98                    | 5 Microsoft | \$598.80    | \$2,994  |
| Microsoft Internet Explorer             | 5 Microsoft | \$0.00      | \$0      |
| Microsoft Windows NT Server 4.0         | 1 Microsoft | \$970.80    | \$970    |
| Microsoft SQL Server 7.0 (10 Licenses)  | 1 Microsoft | \$2,398.80  | \$2,398  |
| Miscellaneous Applications (Unforeseen) | 1 unknown   | \$12,000.00 | \$12,000 |

### Service Center

#### Agents

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#### Supervisors

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#### Common

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#### Backbone

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Total: \$216,677.9

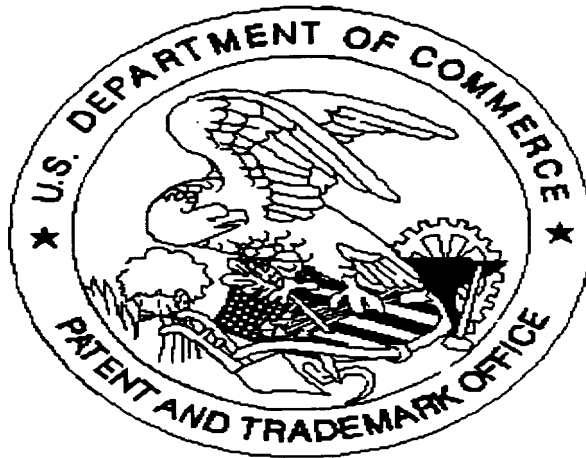
## Setup Fees

| Product                                                 | Units | Manufacturer | Price       | Ext         |
|---------------------------------------------------------|-------|--------------|-------------|-------------|
| Catalyst 2916                                           | 5     | Cisco        | \$1,667.00  | \$8,335.00  |
| Router 3620                                             | 1     | Cisco        | \$9,300.00  | \$9,300.00  |
| Router 3640                                             | 1     | Cisco        | \$13,675.00 | \$13,675.00 |
| Silver Tiered 1 Mbps with 10 Mbps burstable (Full Cage) | 1     | Exodus       | \$2,200.00  | \$2,200.00  |
| BIG/ip Management                                       | 1     | Exodus       | \$2,000.00  | \$2,000.00  |
| Secure Package with Firewall                            | 1     | Exodus       | \$3,850.00  | \$3,850.00  |
| T1 Local Loop                                           | 1     | GTE          | \$1,000.00  | \$1,000.00  |
|                                                         |       |              | Total:      | \$40,360.00 |

## Monthly Recurring

| Product                                                 | Units | Manufacturer | Price       | Ext         |
|---------------------------------------------------------|-------|--------------|-------------|-------------|
| Silver Tiered 1 Mbps with 10 Mbps burstable (Full Cage) | 1     | Exodus       | \$10,780.00 | \$10,780.00 |
| BIG/ip Management                                       | 1     | Exodus       | \$2,350.00  | \$2,350.00  |
| Secure Package with Firewall                            | 1     | Exodus       | \$4,400.00  | \$4,400.00  |
| T1 Local Loop                                           | 1     | GTE          | \$1,000.00  | \$1,000.00  |
|                                                         |       |              | Total:      | \$18,530.00 |

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Office of Initial Patent Examination -- Scanning Division



Application deficiencies found during scanning:

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☒ Page(s) 1 of 10 of appendix were not present  
for scanning. (Document title)

☒ Scanned copy is best available. Declarations / Appendix.